11: India G-4, 5 (1960-1961) 1962 AW11 Kerala AW11

of paddy. This would not only give additional production of pulses which are deficit in the State, but also enrich the soil by leaving a nitrogen residue, and thereby constitute a better rotation. It may be possible to develop pulse crops on 250,000 acres. Assuming an yield of a quarter ton per acre, the additional production of pulses by crop intensification, as suggested here, would be roughly 62,500 tons per year.

2.74 Better plant protection is another measure for getting a substantial increase in yields. It is estimated that yields increase approximately by about 10 per cent through this method. The Department of Agriculture should tackle this problem more effectively. This would only be possible by strengthening the Plant Protection Wing of the Department of Agriculture.

Implements

2.75 Agricultural implements in use in the State are antiquated and inefficient. The wooden plough continues to be the master implement and is used for tillage operations of almost all the crops. Iron ploughs and other tillage implements are not popular. In fact the number of iron ploughs decreased by 22 per cent during 1951–56 and at present stands at 10,225. Tractors during the same period, however, increased from 59 to 187. Irrigation pumps too have shown an increase of 116 per cent.

2.76 The slow adoption of improved implements is mostly due to non-availability of implements and machinery suited to local conditions as well as due to their high cost. The topographical conditions and techniques of cultivation are unique in Kerala and there are no implements designed and developed to suit such conditions. There is, therefore, need for developing efficient implements for rice cultivation, plantation crops, soil conservation work and also for specialized implements such as ridgers and earthers for ginger and tapioca. It would be necessary to have a well equipped and adequately staffed agricultural engineering station to undertake the type of work suggested here. The proposed station may also do some work in designing of irrigation aids and may advise farmers on the selection of pumping sets and cane crushers.

Soil Erosion

2.77 Soil erosion is a serious problem in Kerala. Conditions prevalent in the State such as lateritic soils, undulating to steep topography, the system of farming followed and heavy cloud burst—all these constitute towards excessive soil erosion. There is no reliable estimate regarding the extent of area affected or vulnerable to soil erosion, but it is estimated that about one-third of the cultivated area—approximately 1.5 to 2 million acres—is affected by it. It should be possible to protect at least one million acres through soil conservation measures by 1971.

2.78 Soil conservation work as carried out by the Department of Agriculture has become very popular with the farmers. The Department gives technical advice on soil conservation matters and undertakes operations in specified areas in water-shed units.

31: Slater S-5 (1916-1917) 1918 AWI India
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243 Area yielding one crop—205·23 acres.
Area yielding two crops—448·01 acres.
There are a few acres yielding three crops, but only two crops are assessed.

There are different kinds of paddy, each having different periods of growth, and specially suited to particular soils. The fields are manured and in some cases slightly ploughed just before the rains in summer. The south-west monsoon usually begins in June and lasts for four months. As soon as the rain comes, lands are ploughed and paddy is sown in particularly favourable areas. Then all the fields of the farmer are well ploughed and manured; the seedlings are replanted over the whole area after a growth of twenty-eight days. Some kinds of paddy grow for sixty days, others eighty and ninety days. The system in which no replantation takes place is also in much vogue. The fields are protected from animal or bird pests; after a period of at most three months the paddy is mown by agricultural workers who separate the paddy from the stalks.

Another crop is also generally sown during the north-east monsoon season (October and November) which usually gives rain for about one month.

[407] The ploughs used are primitive and old-fashioned. The furrowing is done in this wise:—a flat piece of iron sharpened at one end is attached to a wooden frame with a handle; this handled frame is attached by means of a pole to a yoke which is placed on the neck of a pair of oxen or buffaloes; the worker then holds the handle and drives the oxen round and round the field until the whole field is well furrowed over. This is done *before* the heavy rain, when the ground is softened, but not under water. The sod is then crushed by means of sticks, this being generally done by females. The women walk in a row, beating the sod to and fro with heavy sticks held in one hand. After the field has been well watered by rains it is once more worked over by means of a log of wood (levelling board) drawn by oxen.

[412] The other agricultural implements used are the sickle, a big knife and spades.

231 *Stock.*—The following is the official census of the stock:—

Working oxen	245
Cows	289
Male buffaloes	361
Cow buffaloes	20
Young stock—	
Calves	169
Young buffaloes	7
Horses	2
Donkeys and mules	22
Sheep and goats	583

Oxen are used to drag carts, and for ploughing the fields. Most of the oxen here appear to be lean and weak; especially those used in ploughing. Cart-drawing oxen are better.

234 Cows are used for milking only, though the Muhammadans of the locality are not averse to eating beef now and then. The milk, buttermilk and ghee of the cow are in great demand especially among the Brahmans who cannot do without them; the lower

31: Slater S-5 (1916-1917) 1918 AWI India
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651 On registered double crop land, the charge for the second crop has been consolidated at one-quarter of the single crop assessment. For occasional second crop on land assessed as single crop, the charge will be one-half the single crop assessment.

231 The stock as ascertained by personal enquiry are as shown below. The account of the stock of Kothachira was not obtainable from the village officials, for it is lost. I have tried my best to make the statement complete and exhaustive. But this is a period of extreme fatality to the stock in these parts. Daily one or more are dying. In a single family there died twenty within forty-five days leaving only one or two pairs. The numbers are—

Bullocks	240	
Cows	403	
Buffaloes	287	
Young stock	374	under 4 years.
Goats	712	
[407] Ploughs	414	
Carts	5	
Oil mills	4	

A comparison with the figures for the census of 1899–1900 for the whole amsom of Kothachira (the three desams of Kothachira, Peringode and Mattur) shows an all-round decrease of about forty per cent. I believe the causes of this great reduction to be partly a succession of very bad seasons for stock, and partly selling off under pressure of poverty.

Cattle feeding.—Bullocks and working oxen and buffaloes, besides being left to graze on the unoccupied dry lands and on cultivable areas when they are lying fallow, are given straw and 'kanchi,' water mixed with the dusty part of rice and 'punac' or oil-cake. For cows and young stock only straw is given besides grazing. Goats are simply left to graze. Straw is given to the above working stock after they are housed in their sheds for the evening. The 'kanchi' water is given in the morning just before leading them into fields and in the afternoon after their work is over. They are led to be washed after field work. Bullocks and buffaloes are the working stock.

The breed.—The cattle are very second rate in their breed. The most healthy working oxen grow to a height of from three to three and a half feet and their strength is not half as much as the oxen employed by the firms of Madras. The cow is a pitiable thing ordinarily two to three feet high and milking on an average from a half to one Madras measure per day.* Comparison, it need hardly be said, with Madras cows is odious. They can be milked for only six months. The best come into milking again within a year, but many only within two years.

241 [237] *Manure.*—Almost all the cattle dung is used for manure. One per cent perhaps goes for purposes of washing floors, etc. The cattle urine is allowed in some places to flow into the dung-pit, but no systematic attempt is anywhere made to utilize it to the best advantage. Besides this, burnt ashes and green manure are in common

* [A Madras measure is 62·5 fluid ounces = 3¼ pints. A fair Madras cow in full milk yields about 3¼ Madras measures per day, i.e., 5 quarts.—Ed.]

31: Slater S-5 (1916-1917) 1918 AWI India
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lings for the second crop are then planted and will be ready for harvest in December or January. In double-crop wet lands both crops are as a rule paddy. But a small area may be used for growing garden vegetables, and this is invariably the case in the three crop lands. Only one crop is raised in the dry lands actually tilled and this crop is determined by a rotation of crops, consisting of paddy, other grains and pulses, gingelly, etc. There is great variety in rotation. Usually the field lies fallow once in three years, often for two or three years continuously, according to the fertility of the soil. The importance of rain in due season for paddy cultivation cannot be over-estimated, the whole prospects of the village for the year may be altogether changed by even a slight failure of the monsoon at the critical stages in cultivation. In that case the local prices of paddy go up very suddenly, as now (August 1917).

Only one type of plough is seen—the usual old fashioned country plough, which merely scratches the ground. It lasts only for a year or two and costs only from ten to twelve annas.

Other implements are the levelling board, harrow (a long wooden hammer used by the hand), spade, kuzhi kutti (i.e., burrowing tool), jack-knife, etc. The levelling board costs about Rs. 2½ and lasts from 6 to 8 years; the spade costs Re. 1 and is worn out in a year. It has a blade set at right angles to the handle and is swung like a pick-axe.

Stock.—

	1914.	1910.
(*a*) Working oxen	296	250
(*b*) Cows	350	382
(*c*) Male buffaloes	256	286
(*d*) Cow buffaloes	6	10
(*e*) Young stock of above species ...	266	221
(*f*) Riding horses	2	...
(*g*) Donkeys and mules...	...	..
(*h*) Sheep	...	...
(*i*) Goats	201	285
(*j*) Pigs	...	...

The 1914 figures are approximately true in 1916.

Working oxen and buffaloes are better fed than others. They are given enough straw or grass, and hot conjee (gruel) mixed with oil-cake, bran, atc. Occasionally working oxen are given flesh (fowls). Cows and cow-buffaloes are given straw and conjee and bran water. They are led out to graze on the hill sides and pastures during the day. Their young follow them. The goats are allowed to stray and feed themselves as best they can. Their milk is used for medicinal purposes and is considered very nutritious.

There is no good pasture in the village, and the cattle are lean and bony. After harvest cattle stray over the stubbles, finding what food they can. The fields are often quite small, say 100 by 75 feet, and frequently there are considerable differences of level between adjoining fields, which is a difficulty in the way of proper irrigation.

Manuring.—About seventy-five per cent of the cattle dung is used as manure. The rest is dried in the form of thick cakes